United States Department of the Interior

FISH AND WILDLIFE SERVICE

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IN REPLY REFER TO:
BO # ES/GJ-6-CO-16-F-002
TAILS 06E24100-2016-F-0134

February 25, 2016

Memorandum

To: Field Office Manager, Bureau of Land Management, Gunnison Field Office, Gunnison, Colorado

From: Western Colorado Supervisor, U.S. Fish and Wildlife Service, Grand Junction, Colorado

Subject: Biological Opinion of the SW Gunnison Bark Beetle Salvage Project

This document transmits the U.S. Fish and Wildlife Service's (Service) final biological opinion for the Bureau of Land Management's (BLM) proposal to conduct salvage harvest of dead, dying, and high-risk spruce trees within the boundary of the Gunnison Field Office (GFO). The Biological Assessment (BA) describes the effects of the action on the threatened Canada lynx (*Lynx canadensis*) in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). The project is located in Gunnison County, Colorado.

This biological opinion is based on our review of your December 30, 2015, BA regarding the effects of the proposed action on the Canada lynx. A complete administrative record of this consultation is on file at this office.

We agree with your determination that the proposed action may affect, and is likely to adversely affect the Canada lynx.

If you have any questions or comments, please contact Kurt Broderdorp at the letterhead address or (970) 628-7186.

cc: Jay Wenum, CPW Gunnison (j.wenum@state.co.us)

Biological Opinion
Regarding the Effects from the Bureau of Land Management's
Dead Spruce Salvage Project
on the Gunnison Field Office, Colorado.
Tails 06E24100-2016-F-0134
Species addressed is the
Canada lynx (*Lynx canadensis*)

Prepared by the
U.S. Fish and Wildlife Service
Western Colorado Office
Grand Junction, Colorado
February 2016

Introduction

This biological opinion (BO) is prepared for the effects to the Canada lynx from The Bureau of Land Management's (BLM) implementation of the proposed SW Gunnison Bark Beetle Salvage project. The project will involve salvage harvest and hazard-tree removal of dead, dying, and high-risk Engelmann spruce trees infested the spruce bark beetles.

This BO was prepared using: 1) Biological Assessment (BA) for the SW Gunnison Bark Beetle Salvage project; 2) previous BOs, file information, and reference materials located at the U.S. Fish and Wildlife Service's (Service) Western Colorado Office.

Consultation History

The Service provided a species list to BLM dated April 16, 2015. The Service has been coordinating with BLM since September 16, 2015, to discuss the project, and review drafts of the BA.

Background on the Purpose and context of a Biological Opinion

Section 7(a) (1) of the Act requires that:

The Secretary shall review other programs administered by him and utilize such programs in furtherance of the purposes of this Act. All other Federal agencies shall, in consultation with and with the assistance of the Secretary, utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species listed pursuant to section 4 of this Act.

Section 7(a) (2) of the Act requires that:

"*Each Federal agency shall, in consultation with and with the assistance of the Secretary, insure that any action authorized, funded, or carried out... is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species... In fulfilling the requirement of this paragraph each agency shall use the best scientific and commercial data available*" 16 U.S.C. § 1536(a) (2).

To meet this standard, when a Federal agency determines that its proposed action may affect a listed species or critical habitat, it enters into consultation with the Service. If the effects are determined to be insignificant, discountable, or entirely beneficial the consultation usually ends in a simple concurrence letter from the Service. If the effects are not insignificant, discountable, or entirely beneficial or are likely to be adverse, a formal consultation is completed and the Service issues a BO.

Section 7(b) (3) (A) "*... the Secretary shall provide to the Federal agency and the applicant, if any, a written statement setting forth the Secretary's opinion, and a summary of the information on which the opinion is based, detailing how the agency action affects the species or its critical habitat.*" 16 U.S.C. §536(b)(3)(A)

A BO reflects the Service's formal analysis as to whether the effects of the proposed Federal action when viewed against the status of the species, the species' environmental baseline, and cumulative effects is likely to jeopardize the continued existence of the species. Likewise, the BO reflects the Service's formal analysis as to whether the effects of the proposed Federal action when viewed against the status of designated critical habitat, the environmental baseline of designated critical habitat, and cumulative effects is likely to destroy or adversely modify the designated critical habitat.

Description of the Proposed Action

The Gunnison Field Office (GFO) is proposing to implement commercial and non-commercial vegetation management to salvage dead, dying, and high-risk spruce in portions of the three separate project areas infested with spruce beetle. Treatments may include removal of some green standing timber in the early stages of beetle infestation. Uninfected trees will be left in the treatment areas to provide a future seed source, maintain vertical diversity, maintain age-class diversity, provide protection for future regeneration, and provide future genetic variability. Non-commercial timber management includes removal of hazard trees near roads, trails, and other infrastructure. The project areas are displayed in the BA, Appendix A, Figure 1. Harvest activities should begin in 2016, and continue for approximately ten years. The BLM will identify each year's treatment areas based on the spread of spruce beetles, stand mortality, and treatment economics, while placing a priority on areas near roads, trails, and critical infrastructure. Salvage treatments will be concentrated in areas where 50 percent or more of the large trees are dead or under attack by the spruce beetle.

Dead or beetle-infested spruce trees will be removed in treatment areas to the extent feasible. All live un-infested tree species (e.g. aspen and subalpine fir) will be retained, except where individual trees impede operations or pose a hazard. Advanced regeneration of spruce that is not dead or infested with spruce beetles will be retained to the extent feasible. The BLM assumes that post-harvest stand conditions will resemble regeneration harvest, such as a seed-tree cut or overstory removal due to the extensive mortality of mature trees.

Primary access for this project will be provided by the existing road system, which may require maintenance or reconstruction as needed to accommodate safety or environmental considerations. No new permanent roads will be constructed.

The proposed action includes construction of up to three miles of temporary roads in both the High Mesa and Indian Creek project areas, and up to five miles in the Blue Mesa project area, for a project total of up to 11 miles. Temporary roads will be constructed to the minimum standard needed for safe and efficient use, which may include vegetation clearing and minor earth movement. Temporary roads will be constructed immediately before access is needed for a particular treatment area and then closed and obliterated as soon as possible after treatment is complete. Public use of these roads will be prohibited.

The proposed action includes project design standards, which serve to minimize effects, provide microsites for denning and small mammal habitat, and retain pockets of understory vegetation to support snowshoe hare habitat, and will ensure structural diversity as the stand matures.

Action Area

Action Area – All areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. [50 CFR § 402.02]

The Lynx Conservation Assessment and Strategy (LCAS) (ILBT 2013, p. 86) recommends project planning to evaluate the effects to lynx at a scale approximating the home range size of an individual female lynx. These home range sized areas are referred to as lynx analysis units (LAU) and are approximately 25,000 acres in size. However, LAUs do not represent actual lynx home ranges, and are intended to provide the smallest scale at which the effects of management actions on lynx habitat are evaluated.

The action area consists of the Little Cimarron, Blue/Pine Creek, Lake Fork Gunnison, and Cebolla Creek LAUs, displayed in Figure 1, Appendix A, in the BA.

Status of the Species /Critical Habitat Description

Status of the Species – an analysis of appropriate information on the species' life history, habitat and distribution, and other data on factors related to its survival and recovery. This analysis considers the effects of past human and natural activities or events that have led to the current condition of the species. This information is usually presented in listing documents and refined in recovery plans. [Endangered Species Consultation Handbook 1998]

The lynx was listed in the contiguous United States as threatened effective April 23, 2000 (Service 2000). The Service identified one distinct population segment in the lower 48 states (Service 2000, 2003). On September 12, 2014, the Service published its revised final rule designating critical habitat for lynx (79 FR 54781). Habitats within Colorado were not designated by the final rule and will not be discussed further.

On August 20, 2008, we issued biological opinion number BO ES/LK-6-CO-08-F-024 (Tails: 65412-2008-F-00370), which provides detailed information about the biological needs and ecological setting regarding lynx. The status of the lynx for this biological opinion incorporates the status of the species section of BO ES/LK-6-CO-08-F-024 here by reference.

The lynx is a medium-sized cat with long legs; large, well-furred paws; long tufts on the ears; and a short, black-tipped tail (McCord and Cardoza 1982). The winter pelage of the lynx is dense and has a grizzled appearance with grayish-brown mixed with buff or pale brown fur on the back, and grayish-white or buff-white fur on the belly, legs and feet. Summer pelage of the lynx is more reddish to gray-brown (Koehler and Aubry 1994). Adult males average 10 kilograms (22 pounds) in weight and 85 centimeters (33.5 inches) in length (head to tail), and females average 8.5 kilograms (19 pounds) and 82 centimeters (32 inches) (Quinn and Parker 1987). The lynx's long legs and large feet make it highly adapted for hunting in deep snow.

Snowshoe hares (*Lepus americanus*) are the primary prey of lynx, throughout their range (Mowat et al. 2000). Red squirrels are reported to be the second most important food source for lynx in Alaska (Staples 1995) and Colorado (Shenk 2009) and the main alternate prey of lynx during periods of low hare abundance in Yukon Territory (O'Donoghue et al. 1997 p. 154).

Status of Lynx Population in Colorado

Accurate estimates of the lynx population in Colorado are not available. Of the 218 lynx reintroduced into Colorado, there were 122 known mortalities of released adult lynx (Shenk 2010). However, survival rates within the reintroduced lynx population in Colorado were considered high within the study area (Devineau et al. 2010 entire). The estimated survival rates for the reintroduced lynx population were higher than estimates obtained in Canadian studies for natural, lightly trapped populations of Canada lynx (Devineau et al. 2010 entire, Slough and Mowat 1996, O'Donoghue et al. 1997, and Poole 1994). As of 2009, 126 kittens were born in Colorado (Shenk 2009), with 33 percent of collared female lynx having dens (Shenk 2010). Ongoing monitoring of the lynx population suggests that lynx are present within the monitoring area, including evidence of continued reproduction (Ivan 2015 entire). We assume that lynx are present within the appropriate habitat across the entire state.

Conservation Needs of the Canada Lynx

Conservation Needs - those methods and procedures which are necessary to bring a listed species to a point where the species no longer needs the protection of the Endangered Species Act. [Endangered Species Consultation Handbook 1998] For purposes of this document, conservation needs are considered to be synonymous with the species' survival and recovery needs.

Recovery Outline

In 2005, the Service, along with Federal partners, completed a Recovery Outline (Service 2005) for the Contiguous United States Distinct Population Segment of the Canada Lynx, which serves as an interim strategy to guide recovery efforts until we complete a final recovery plan. The outline identifies core, secondary, and peripheral areas for lynx, and preliminary recovery actions. The Recovery Outline provides four objectives that provide a framework for progressing towards the recovery goal of delisting the lynx. In addition, the Recovery Outline identified a number of recovery actions needed to attain the objectives. As the recovery actions relate to the proposed action, we identified the following recovery action that BLM should consider to support the delisting goal.

1. Identify the risk to lynx populations posed by forest management techniques and human-induced mortality from factors such as roads, trapping and hunting. Address these factors as necessary to ensure the long-term persistence of lynx populations in core areas.

Environmental Baseline

Environmental Baseline – the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. [50 CFR § 402.02]

The environmental baseline for lynx is primarily evaluated by assessing the amount of lynx habitat in an early stand initiation structural stage within an individual LAU. Our current understanding of lynx home ranges suggests that at least 70 percent of the lynx habitat within a LAU should be in a suitable (functioning) condition to support a resident lynx year-round (ILBT

2013). In addition, other factors such as roads, ski areas, other human developments, high levels of dispersed recreation, and the spruce bark-beetle epidemic may negatively influence the capability of a LAU to support lynx survival and reproduction.

Table 1 Environmental Baseline Habitat Statistics in LAUs

LAU Name	Lynx Habitat			Non-Habitat	Total LAU Acres
	Suitable	Unsuitable	Total		
	Acres (% of Total Lynx Habitat)		Acres (% of LAU)		
Little Cimarron	16,514 (96%)	630 (4%)	17,144 (34%)	33,551 (66%)	50,695
Blue/Pine Creek	30,861 (97%)	962 (3%)	31,823 (48%)	34,362 (52%)	66,185
Lake Fork Gunnison	48,153 (98%)	1,031 (2%)	49,185 (41%)	71,033 (59%)	120,218
Cebolla Creek	63,310 (97%)	1,747 (3%)	65,057 (42%)	90,004 (58%)	155,061

The Little Cimarron LAU is mostly private land, with lynx habitat concentrated in the southern, higher elevation end of the LAU. Vegetation on private lands consists mostly of grassland and shrubland with limited suitable lynx habitat. Several gravel and native surface roads cross lynx habitat. The LAU contains scattered permanent and seasonal residences located in suitable habitat. These developments likely resulted in habitat loss, but the cumulative losses are unlikely to measurably reduce habitat effectiveness within the LAU as a whole. Stand initiation structural stage conditions (habitat in an unsuitable condition) resulted from past timber harvest and prescribed burning. Although regeneration is evident in these areas, the current structure of horizontal cover is insufficient to support snowshoe hares year-round.

The Blue/Pine Creek LAU is similar to the Little Cimarron LAU with respect to the distribution of suitable lynx habitats, land ownership, human activity, and fragmentation. One exception is the Arrowhead Ranch community north of the Blue Mesa project area, which contains several hundred small (e.g. one-acre) parcels. Some parcels contain residences, while others are undeveloped. The community area contains some lynx habitat, which is fragmented both by natural vegetation patterns, roads, building sites, and other developments. These developments likely resulted in habitat loss, but the cumulative losses are unlikely to measurably reduce habitat effectiveness within the LAU as a whole. The amount of stand initiation structural stage (currently unsuitable habitat) reported for this LAU resulted from past timber harvest and prescribed burning. Although trees are regenerating in these areas, they have not yet developed sufficient horizontal to support snowshoe hares year-round.

The Lake Fork Gunnison LAU is bisected by State Highway 149. However, this 2-lane paved highway runs almost entirely through grasslands and shrublands that do not provide suitable lynx habitat. The town of Lake City, Colorado, is located in a valley bottom near the southern end of the LAU, but is not within lynx habitat. Lynx habitat in this LAU is located at higher elevations, in the southern portion of the LAU and is naturally fragmented. Lynx habitat is located primarily on BLM lands with limited human disturbance caused by past timber harvest, gravel and native-surface roads, and trails. The largest contiguous blocks of lynx habitat are in the Indian Creek project area (Figure 1, Appendix A in the BA) and the Powderhorn Wilderness. Stand initiation structural stage conditions (currently unsuitable habitat) result from past timber harvest, prescribed burning, and wildfire. Although trees are regenerating in these areas, they have not yet recovered sufficient horizontal cover to support snowshoe hares year-round.

The Cebolla Creek LAU is similar to the Lake Fork Gunnison LAU. Extensive BLM lands north of the Indian Creek project area are primarily grasslands and shrublands and do not support lynx habitat. Lynx habitat in this LAU is generally found at the higher elevations, from the Indian Creek project area (Figure 1, Appendix A in the BA) south and east, and is naturally fragmented by changes in aspect and elevation. Lynx habitat is located mostly on BLM lands with limited human disturbance (past timber harvest, gravel and native-surface roads, and trails). The largest contiguous blocks of lynx habitat are in the Indian Creek project area and to the south and east in the Powderhorn Wilderness. Stand initiation structural stage conditions (currently unsuitable habitat) are the result of past timber harvest, prescribed burning, and wildfire. Although trees are regenerating in these areas, they have not yet recovered sufficient horizontal cover to support snowshoe hares year-round.

Competition between lynx and other predators caused by snow compaction

A system of groomed snowmobile trails extends from the Arrowhead Ranch community area, into the Blue Mesa project area (Figure 1, Appendix A in the BA), within the Blue/Pine Creek and Lake Fork Gunnison LAUs. There are 13.47 miles of groomed trails in the Blue/Pine Creek LAU, and 1.03 miles of groomed trails in the Lake Fork Gunnison LAU, but no groomed trails in the Little Cimarron and Cebolla Creek LAUs. Some literature suggests that competing predators use human created compacted snow routes to facilitate movement within lynx habitat. However, the existing science is inconclusive regarding the existence of competition between lynx and other predators.

The spruce beetle epidemic has likely altered the population dynamics of the lynx's primary and main alternate prey species (snowshoe hare and red squirrel respectively). A substantial loss of mature cone-producing trees (the main food source for red squirrels) is expected because of the high level of mortality of overstory spruce (up to 99 percent in some stands). Loss of mature cone-bearing spruce trees at large spatial scales may significantly reduce red squirrel density. Little research has addressed how red squirrels respond to insect infestation (Koprowski et al. 2005). However, some research, concluded that red squirrel populations declined significantly in areas with >40 percent mortality of spruce trees due to beetle infestations in Alaska (Matsouka et al. 2001, and Colorado Yeager and Riordan, 1953; cited in Koprowski et al. 2005).

When snowshoe hare densities decline, lynx rely heavily on red squirrels for survival (ILBT 2013, p. 20). However, a diet of red squirrels alone may not be adequate to ensure lynx reproduction and survival of kittens (Koehler 1990a, p. 849). During snowshoe hare population lows, and where their main alternative prey is not available or is at very low densities resulting from mature spruce mortality, lynx may not produce kittens, may expand or abandon their home range in search of prey in order to survive, or starve to death. Other areas with sparse understory development may become relatively non-functional habitat for extended periods. Lynx may traverse areas of standing dead timber that lacks sufficient understory to access higher quality habitat where prey may be more abundant (Koehler et al. 2008, p. 1522). Reduced foraging habitat in the spruce zone negatively influences the ability of lynx to maintain a home range within a LAU and connected LAUs until adequate forested cover redevelops, approximately 20-30 years). The severity of effects caused by the spruce beetle epidemic depends largely on

the spatial distribution of mature tree mortality, and the quantity and quality of the developing understory vegetation within beetle killed stands.

At present, the extent of the spruce bark beetle infestation is unclear within the action area. We assume, based on the high tree mortality (up to 99 percent in some stands), and the spatial extent of the project areas (approximately 8,700 acres) reported in the BA, that the quantity of lynx habitat in the stand initiation structural stage (currently unsuitable habitat) is under-represented in the LAU tables above. Therefore, it is likely that resident lynx may have expanded their home range in order to find sufficient prey for survival and reproduction.

Effects of the action on Canada lynx

Scientific basis for evaluating potential effects to Canada lynx

Disturbance

Few studies have examined how lynx react to human presence. Some anecdotal information suggests that lynx are quite tolerant of humans, although given differences in individuals and contexts, a variety of behavioral responses to human presence may be expected (Staples 1995, Mowat et al. 2000). Squires et al. (2010, p. 1657) found that lynx did not avoid habitats adjacent to forest roads, and these roads are unlikely to reduce the effectiveness of adjacent habitat or limit lynx movements on a daily or seasonal basis.

Some wildlife species have been found to be more sensitive to disturbance when bearing and rearing young than in other times of the year. Olson et al. (2011, p. 459) reported they approached eight dens of females; half of the females moved their dens within 4 days, while the other half did not move dens for at least 20 days following disturbance. Olson et al. (2011, p. 459) noted that lynx dens were located in more remote areas and unlikely to be disturbed by humans. Frequent movement of kittens from natal dens to one or more maternal dens is normal behavior exhibited by lynx even in the absence of human disturbance (Olson et al. 2011, p. 459).

Vegetation Management

Lynx kittens are vulnerable when very young, and are often left alone while the female lynx hunts (Slough 1999, Moen et al. 2008, Olson et al. 2011). Kittens could be present nearby or in den sites while salvage operations are taking place, and could potentially be injured or killed by logging equipment and activities.

The primary factors driving lynx populations, behavior, and distribution is the abundance and distribution of their primary prey, snowshoe hare. Stand structure, composition, and arrangement are important elements of habitat for snowshoe hares and lynx. Vegetation management practices can have beneficial, neutral, or adverse effects on lynx and snowshoe hare habitat and populations, and the duration of effects varies (ILBT 2013, p. 71).

Fires, insect epidemics, and some types of timber harvest cause the boreal forest to revert to early stand initiation structural stage, which is a temporary condition that does not provide dense cover

and food for snow-shoe hares, nor does it provide foraging habitat for lynx (ILBT 2013, p. 90). In bark beetle infested areas that exhibit multi-story characteristics, understory conditions may vary from understory vegetation that is lacking, to areas where live vegetation continues to provide horizontal cover to support hares and lynx. Stem density (e.g. horizontal cover) and snowshoe hare density are directly and positively correlated (Conroy et al. 1979, Sullivan and Sullivan 1988, Koehler 1990b, Koehler and Brittell 1990, Thomas et al. 1997, Hodges 2000, Mowat et al. 2000, Homyack et al. 2006). Salvage of dead overstory trees causes incidental damage to understory vegetation (if present) through crushing, and damage, etc., reducing horizontal cover, thus reducing the capacity of the stand to support snowshoe hares.

Competition between lynx and other predators caused by snow compaction

Packed trails created by snowmobiles, cross-country skiers, etc., may serve as travel routes for potential competitors and predators of lynx, especially coyotes (ILBT 2013, p. 80-81). While some information suggests that some low level of competition for prey could occur naturally between lynx and coyotes. However, any competition likely varies spatially or temporally depending on overall prey availability and composition (ILBT 2013, p. 82). Data are lacking to demonstrate that, if competition occurs, it causes adverse effects to lynx feeding, breeding, or sheltering. We assume that plowing of forest roads within lynx habitat to facilitate timber removal causes similar effects to lynx.

Project-Specific Effects

Disturbance

Active timber harvest operations tend to create high noise levels, and human activity. It is reasonable to assume lynx will be displaced from the treatment areas during harvest operations. Habitats outside of the active treatment areas and haul routes are available for use by displaced lynx. Salvage harvest and associated activities could occur throughout the year for approximately ten years, but will be staggered spatially and temporary and will not affect the entire analysis area at once. Displacement may cause increased energy expenditure by lynx due to avoidance of activities and movement to undisturbed habitats. While disturbance can lead to changes in behavioral patterns in lynx, we do not have a clear understanding of the significance of these responses to lynx survival. Although the BA states that the potential effect of displacement is neither discountable nor insignificant, we have no reasonable means to measure or quantify this effect. However, we have no reason to believe that displacement of individuals will lead to injury or death of lynx in the project areas.

Vegetation management

The proposed action includes salvage harvest and related activities on up to 7,545 acres of suitable lynx habitat and 909 acres of unsuitable lynx habitat. The BLM assumed that harvest activities will convert all currently suitable lynx habitats in the treatment areas to the stand initiation structural stage. The habitat conversion will be spread across the four LAUs as displayed in Table 2.

Table 2.

Lynx Analysis Unit	Acres Converted to Stand Initiation
Little Cimarron	1,107
Blue/Pine	3, 429
Lake Fork Gunnison	2,809
Cebolla Creek	200

Salvage operations will reduce the quality and quantity of snowshoe hare habitat within the respective LAUs through the removal of dead trees that contribute to horizontal cover, and the reduction of the extent and density of understory vegetation and horizontal cover in the treatment areas. Project design standards will minimize impacts to advanced regeneration, understory vegetation, and dense horizontal cover. However, salvage operations will incidentally remove some of these habitat components, thus reducing snowshoe hare habitat. Reducing snowshoe hare habitat translates to adverse effects to normal behavioral patterns of lynx including feeding, breeding and sheltering which may reduce the ability of a resident lynx to survive or reproduce. However, we do not expect these effects to increase the likelihood of injury or death of lynx.

The proposed action is not expected to have any measurable effect on red squirrels in the analysis area. As described in the environmental baseline, the ongoing spruce beetle infestation is expected to cause the red squirrel population to decline within the action area. The proposed action will not exacerbate this decline because salvage operation will target dead or infested trees the spruce that no longer provide a food source for red squirrels.

In the short-term (20-30 years), treated stands begin to regenerate to spruce, providing dense horizontal cover, eventually becoming functional for lynx year-round in the mid-term (30-50 years). The development of mature forest including down logs and coarse woody debris will require a century or more, but these features are not considered lacking within the broader landscape. Outside of the treatment areas, understory vegetation and horizontal cover will likely release as the overstory dies and additional light, nutrients, and water are available for growth. Residual vegetation is expected to be sufficient to provide cover for lynx moving through, or foraging in, the project areas.

Temporary roads, skid trails, and landings will be needed to remove harvested trees. These project features will damage or remove some advanced regeneration and understory vegetation, as well as breaking up horizontal cover. Quantification of habitat impacted by temporary roads, skid trails, and landings is included in the total acres impacted by the project.

Competition between lynx and other predators caused by snow compaction

The proposed action will likely include winter logging, temporarily increasing snow compaction above baseline conditions within the LAUs for a period of approximately ten years. Roads and skid trails used for winter logging will be plowed or compacted. Snow will also be compacted within treatment areas in association with creation of skid trails and harvest of dead trees. No new permanent snow compaction will be created by the proposed action. Temporary snow compaction will be distributed spatially and temporally across the project area depending on the location of activity during the winter months throughout the life of the project. Within a given a

sale area, increased snow compaction will only occur during a one year period when logging activity occurs. We recognize that some uncertainty exists regarding competition for prey between lynx and coyotes. However, data are lacking to demonstrate that, if competition occurs, it causes adverse effects to lynx feeding, breeding, or sheltering. Therefore, due to the temporal and spatial distribution of snow compaction within the project area over the life of the project, we have no reason to believe that the effects of increased snow compaction will increase the likelihood of injury or death of a lynx.

Cumulative Effects

> Cumulative Effects – are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation. [50 CFR § 402.02]. This definition applies only to section 7 analyses and should not be confused with the broader use of this term in the National Environmental Policy Act or other environmental laws. [Endangered Species Consultation Handbook 1998]

The BA reported that there were no cumulative effects within the action area that were reasonably certain to occur.

Conclusion regarding jeopardy

> Jeopardize the continued existence of – to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species. [50 CFR § 402.02].
>
> Recovery – improvement in the status of listed species to the point at which listing is no longer appropriate under the criteria set out in section 4(a) (1) of the Act. [50 CFR § 402.02]

After reviewing the current status of the Canada lynx, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the Canada lynx.

We reached this conclusion because: Although the proposed action will result in the impacts to lynx habitat, we concluded that these effects were unlikely to lead to injury or death of lynx. Since we do not anticipate that take will result from salvage harvest or the incidental damage resulting from harvest activity, and the remaining habitat within the action area LAUs is sufficient to support a resident lynx, the proposed action is unlikely to result in jeopardy to the Canada lynx.

Incidental Take Statement

> Take - to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct. [Endangered Species Act. [16 U.S.C. 1531 et seq.]]
>
> Harm - an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. [50 CFR 17.3]

Harass - an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. [50 CFR 17.3]

Incidental take – a taking that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant. [50 CFR § 402.02]

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Under the terms of section 7(b) (4) and section 7(o) (2), taking that is incidental to and not intended as part of the agency action is not considered to be a prohibited taking under the Act, provided that such taking is in compliance with the terms and conditions of an Incidental Take Statement.

For the reasons discussed above in the *Effects of the Action* section, we do not anticipate incidental take of Canada lynx.

Conservation Recommendations

Conservation Recommendations - suggestions of the Service regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information. [50 CFR §402.02]

We recommend that skid trails and landings be treated in some way (i.e. ripping of the soil, disking, etc.) to break up soil compaction resulting from logging activities to provide for a more suitable seedbed for future forest regeneration. We have observed on numerous site visits that skid trails and landing sites generally do not support dense regeneration, and/or is not as vigorous and dense as adjacent areas within the stand. Skid trails and landings are usually considered a temporary impact, assuming that the vegetation will recover similar to adjacent area. However, we believe, absent measures to break up soil compaction, that skid trails and landings tend to be more permanent and do not regenerate along with adjacent vegetation, thus fragmenting forested habitat. We recommend that the BLM require operators to take action to break up areas of compacted soils to encourage consistent regeneration throughout the stand.

Reinitiation Notice

This concludes formal consultation on the action outlined in your December 30, 2015, request for consultation. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) any take of the Canada lynx occurs; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

Thank you for your continued interest in the conservation of endangered, threatened, and proposed species. If you have any questions or comments, please contact Kurt Broderdorp at the letterhead address or (970) 628-7186.

Literature Cited

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